# SANDIA NATIONAL LABORATORIES
# QUALITY ASSURANCE PROGRAM
# for the
# OFFICE OF CIVILIAN RADIOACTIVE WASTE MANAGEMENT

## QAP 13-1

## CONTROL OF SAMPLES, CHEMICAL STANDARDS, AND CHAIN-OF-CUSTODY

## Revision 1

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## CHANGE HISTORY

| Revision | Description | Effective Date |
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| 0 | This is the initial version of this document. | 05/13/2004 |
| 1 | Administrative changes resulting from Audit OQA-FS-04-07 | 05/20/2004 |

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# 1.0 Purpose and Scope

This procedure prescribes the Sandia National Laboratories (SNL) Office Science and Technology and international (OSTI) Science and Technology (S&T) of process for ensuring samples and chemicals used as standards are identified and controlled in a manner consistent with their intended use. Controlling documents shall identify responsibilities, including interfaces between organizations, for documenting and tracking sample possession (chain-of-custody[1]) from sample collection and identification (including *in situ* orientation relative to location as appropriate) through handling, preservation, cleaning, shipment, transfer, analysis, storage, final use and disposition. The purpose of these controls is to ensure that a complete record of samples and standards traceability is maintained. This includes an appropriate traceability of the chemicals used to prepare samples and standards. We define a sample as a representative fraction of a material analyzed to determine the characteristics (e.g. physical, chemical) of this material and a chemical as a substance characterized by definite molecular composition, employed in the preparation of a sample. We define a standard as an accepted reference sample used for establishing a unit for the measurement of a physical or chemical quantity or which is used producing laboratory-generated samples.

**Note**: Additional requirements may need to be addressed i.e., corporate, site specific, and Environment, Health and Safety policies. For packaging and shipping of hazardous materials, consult the SNL ES&H Manual, Chapter 12 “Packaging and Transportation of Hazardous Materials,” MN471001, http://www-irn.sandia.gov/corpdata/esh-manuals/mn471001/c12.htm or contact Center 6800 ES&H Coordinator.

Acronyms and definitions for terms used in this procedure may be found in the OSTI Glossary.

# 2.0 Implementation Actions

## 2.1 Controlling Documents

Test plans (QAP 20-1) and/or Experimental Implementing Procedures (EIPs) may be used to define sample preparation, handling, preservation, cleaning, shipment, transfer, analysis, storage, and final disposition. Sample collection and analyses may also be documented in scientific notebooks as described in QAP 20-2 (Scientific Notebooks [SNs]). When a sample requires change in location such as transfer from the field to a laboratory or a change in ownership/custody a Chain-of-Custody form shall be prepared and used to document these transfers. A Chain-of-Custody (CoC) Form is found as Appendix A to this procedure. When a sample is to be transferred to a laboratory by the SNL Sample Management Office (SMO), the SMO Chain-of-Custody Form may be used. Special handling, storage, or other preservation or shipping requirements require description in plans, notebooks, or activity specific procedures. Planning documents and other documentation are required to ensure that sample collection methods, controls, and identification result in samples, which are appropriate for their intended use.

## 2.2 Sample and Chemical Identification

Samples shall be collected or created in accordance with the appropriate controlling work documents. Sample control measures, including identification and documentation shall ensure

traceability continuously from collection through final disposition. These measures shall include a unique sample identifier, sample location, other pertinent information concerning the sample, and recorded in the drilling log, scientific notebook, on sample information forms (i.e., Chain of Custody), or other appropriate records format. Sample identification shall be verified and documented before each transfer or release for analysis, testing, or disposition. If a sample has a maximum life expectancy or expiration date, that date shall be documented on the sample or sample container whenever possible. As a minimum, the sample shall be marked or tagged as "limited-life" material. If samples are sub-divided or sub-sampled, the unique identification shall be transferred to each sample part or sample container. A second CoC form may be required to track sub-divided samples or sub-samples. If a second CoC form is required, the original form or a tracking copy of the original form should be attached to the second form to maintain sample tracking and traceability.

**Note:** Representative samples from difficult to repeat sample collection activities, such as principal boreholes, shall be maintained as an archive sample. The controlling work document(s) shall specify the representative samples to be archived. If the representative sample has a maximum life expectancy or expiration date, that date shall be documented on the sample or sample container, if possible. As a minimum, the representative archive sample shall be marked or tagged as "limited-life material."

Sample identification shall be maintained by placing clear, legible, and permanent identification directly on the samples, if possible, or in a manner that ensures that identification is maintained. If direct physical markings are either impractical or insufficient, other appropriate means shall be employed e.g., physical separation, labels or tags attached to containers. Label markings must not detrimentally affect the sample content, integrity, or form. If sample labels become obliterated or hidden by surface treatments or sample preparation, other means of identification must be substituted. These requirements apply to core samples and geologic samples as well as other materials.

Markings and labels shall indicate the need for special environments or other special controls. If samples are sub-divided or sub-sampled, the unique identification must be transferred to each sub-sample part or sub-sample container part that requires identification.

The chemicals used to prepare samples and standards shall be identified by their name, manufacture name, lot number, and expiration date when applicable.

### 2.3 Handling, Storing, and Shipping Samples

The person in charge of sample collection/creation shall ensure that samples are protected during shipping and handling to prevent damage or deterioration that would compromise the intended use of the samples, and therefore the data derived from sample analysis. Samples collected by an organization other than SNL OSTI shall be handled and shipped in accordance with the requirements of that organization until the sample becomes the responsibility of the SNL OSTI.

Methods shall be established for samples requiring storage. The control of sample identification for the planned storage and duration shall provide for the maintenance or replacement of markings and identification tags that have been damaged during handling or aging and the protection of identification markings from deterioration due to environmental conditions.

Controlling documents shall be developed to specify any special protective environments (e.g., inert atmospheres, specific moisture content levels, or temperature levels) and equipment (e.g.,

containers) required for the samples. These documents or procedures shall be issued *prior to* collecting, handling, and shipping samples; and shall address the creation and maintenance of such environments. Specific requirements for handling, storage, cleaning, analysis, packaging, shipping, and preservation of critical, sensitive, perishable, archive or high-value samples shall be developed, implemented, and verified when applicable.

When samples are not in the possession of the individual designated with the custody of the samples, the samples shall be stored in a secured area. Samples on which analyses or tests have been performed shall be identified and maintained in a separate part of the storage area. Chemicals shall be appropriately stored.

## 2.4 Sample Storage/Archiving

When samples are not in the possession of the individual designated with their custody, they shall be stored in a secure area with associated documentation (i.e., Chain-of-Custody). A secure area is defined as an area where access to the samples is limited and controlled, e.g., locked rooms, cabinets, desks, drawers. Samples shall be controlled to preclude the mixing of like samples. Samples for which analyses or tests have been performed shall be identified and maintained in a separate part of the storage area.

Samples and chemicals shall be stored in areas where the environment is controlled to prevent their degradation. Upon expiration of limited lifetime samples or chemicals, the samples or chemicals should be properly discarded (if hazardous and/or radiactive, contact Center 6800 ES&H coordinator). If expired samples or chemicals are not discarded (for legal or other reasons) they shall be segregated or suitably identified (tags, markings) to prevent their use.

Archiving of samples is done to preserve them for future investigation or review. The organization responsible for archiving samples shall have a documented and approved process for accomplishithe archiving task. This controlling document shall include procedures for identifying, tracing, and retrieving archived samples and standards, and shall provide for controlled environmental conditions commensurate with the intended use of the samples and standards. Maintenance or replacement of markings or identification tags needed to preserve sample identification shall also be addressed.

## 2.5 Sample Disposition

Controlling documents should provide requirements for the disposition of samples. If samples are disposed, the method, place, and date of disposal must be documented. See note concerning H&S issues near the beginning of this procedure. The CoC is then closed.

## 2.6 Quality Assurance Concerns with Samples Conditions Adverse to Quality or Significant Conditions Adverse to Quality Samples

When any of the following conditions have occurred or are suspected, the OSTI QA shall be contacted for investigation, resolution and disposition. Deviations include, but are not limited to, the following:

- Improper handling and/or shipping
- Loss of traceability
- Loss of identity
- Lost samples
- Use of samples or chemical standards after expired lifetimes
- Chain-of-Custody violations

- Damaged samples or storage concerns (e.g., from temperature extreme)

These conditions may result in taggin and corrective actions using the nonconformance process in QAP 6-1, Corrective Action.

## 3.0 Records

Note: Implementation of QAP 13-1 generates uniquely labeled samples and associated records pertaining to their use, collection, tracking, analysis, and dispostion. Activity specific procedures may be written in accordance with QAP 5-1, Implementing Procedures. Sampling information shall be described in planning documents and actions recorded in scientific notebooks or CoCs. The following QA records, which may be generated through implementation of this procedure, shall be prepared and submitted OCRWM and a copy to the SNL Records Center in accordance with QAP17-1 (Records):

QA Record

- Drilling logs
- Field sampling notebooks
- Sample inventory lists
- Sample archive maps
- Scientific notebooks
- Data packages
- Chain-of-Custody Forms

## 4.0 Appendices

Appendix A: Chain-of-Custody Form

## Appendix A

| | **OSTI Chain of Custody** | **Form Number: QAP 13-1-1** **Page 1 of _____** Attach more forms as needed |
|---|---|---|

**1. Initial Sample Custodian** _____ (Printed Name) Organization: _____ Date: _____

**2. Sample Collection or Creation Information** Scientific Notebook ID: _____ Team Members/Organization.

Test Plan ID: _____ Field Log ID: _____

Sample Location: _____ (i.e. borehole/core no./lab bldg. no./etc…) enter n/a if none

| **3. Sample Identification** Sample/Sub-Sample # | Date Collected | Container Type | Container Volume | Preser-vative | Associated Test | Sample Description |
|---|---|---|---|---|---|---|
| | | | | | | |
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**4. Sample Requirements**

Handling:

Storage & Preservation:

Shipping:

Disposition:

Expiration Date:

| **5. Custody Transfer** | Printed Name | Signature | Organization/Company | Date-Time | Sample Condition |
|---|---|---|---|---|---|
| a. Relinquished by: | | | | | |
| a. Received by: | | | | | |
| b. Relinquished by: | | | | | |
| b. Received by: | | | | | |
| c. Relinquished by: | | | | | |
| c. Received by: | | | | | |
| d. Relinquished by: | | | | | |
| d. Received by: | | | | | |
| e. Relinquished by: | | | | | |
| e. Received by: | | | | | |

Upon sample receipt, note condition. This form (copy for your records) should follow samples through its life, until final disposition, then send original to CRWM Records Center.
For samples that are potentially hazardous and/or radioactive & require packaging and shipping, contact Center 6800 ES&H Coordinator or see SNL ES&H Manual, Chpt. 12.